

BIOSYSTEMATIC STUDIES, DISTRIBUTION AND CONSERVATION STATUS OF *GUAIAECUM OFFICINALE* L. IN KARNATAKA STATE

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A B S T R A C T

Guaiacum L. is an evergreen tree indigenous to South America, West Indies and USA. It was introduced during British period. The stem is hard, abundant resin wood, ash-grey-green bark and paripinnate leaves. The flowers are blue-purple in colour and occur in axillary clusters. The fruit is a capsule. Anomocytic, Paracytic and tetracytic types of stomata present only on abaxial surface of the leaf, trichomes absent on both surface. Pollen monad, radially symmetrical, tricolporate. The secondary veins are joined to form a loop at the margin. Phenolic test, alkaloid test etc. gave positive results. This plant is having commercial as well as medicinal value. In Karnataka state this plant found only in two places, one in Lalbagh, Bangalore and another in Karnataka College, Dharwad. Silviculture experiments were conducted but not succeeded. In both the places flowers are many, but fruit setting is negligible. It inhibits the spreading of the species in Karnataka.

INTRODUCTION

The genus *Guaiacum* L. belongs to the family Zygophyllaceae. It is an introduced plant during British period, indigenous to South Africa, West-Indies and USA.

Biosystematics studies on *Guaiacum* are little attempted, whereas conservation work in India, particularly in Karnataka are few. This plant has got commercial as well as medicinal value. Hence, the present investigation has been undertaken to study the biosystematics, distribution and conservation.

MATERIALS AND METHODS

Guaiacum specimen was collected from Dharwad (Karnataka College) and Bangalore (Lalbagh). For each collection, voucher number was given and deposited as a voucher specimen in the herbarium of Botany Department, Karnataka Science College, Dharwad. The following studies were made.

Epidermal : The dried leaves were washed in water and upper and lower epidermis

was taken out tearing the epidermis peels. Then it is washed with sodium hypochlorite (bleaching agent) after washing with water. Thus prepared epidermal peels of both upper and lower surfaces are stained with saffranin and mounted on a clean microscopic slide using DPX mount or glycerin.

Foliar Venation : Young leaves sometimes differ from mature leaves; hence it is desirable to collect mature leaves as far as possible. Here we have paid special attention on the nervation of the leaf. Placing a thin paper on the leaf and darkening it with dark 2B pencil obtain leaf prints. In this way all the nerves are reproduced as they are without any modifications.

Palynological : In order to study the shape and aperture of the pollen in turgescence state, pollen slides were prepared following (Woodhouse, 1935) and for the structure of exine, acetolysed, non chlorinated pollen grains were prepared following Erdtman (1966).

Phytochemical : Preliminary phytochemical tests were conducted on fresh leaf for phenolics (phenols, cigarette, hot water, syringin, maule and ellagic acid tests), flavanoids (flavanoids and shinoda test), and other miscellaneous plant constituents like alkaloids described by Gibbs (1974).

Silvicultural : The collected seeds from both the places were used for germination. Seed coat was removed and kept in petridish with wetted filter paper for germination.

OBSERVATIONS AND DISCUSSION

The following observations are based on morphology, epidermal, foliar venation palynological, phytochemical and silviculture.

Morphology : An ornamental evergreen tree with pretty rich blue flowers, the trunk is greenish-brown the wood of slow growth but attains a height of 40 to 60 feet, stem almost always crooked, bark furrowed, the wood is extraordinary heavy, solid and dense, fibers cross-grained; pinnate leaves, leaflets four, oval, obtuse; fruit obcordate capsule; seeds solitary, hard, oblong.

Epidermal : Epidermal cell Complex: Epidermal cells were four to many sided, anisodiametric, walls straight.

Stomatal complex : Stomata are of three types, Anamocytic, Paracytic and Tetracytic confined to lower surface.

Trichome Complex : Trichomes are absent.

Foliar venation : Actinodromous type of venation, secondary veins joined to tertiary veins to form loop at the margin.

Palynological : Pollen monad, radially symmetrical, tricolporate, sexine 1.93 micrometer, nexine 1 micrometer reticulate ornamentation.

Phytochemical : The preliminary test to identify the secondary metabolites as on the one hand shown the consistent occurrence of phenol test, flavanoid test, alkaloid test,

cigarette test, leucoanthocyanin test, ehrlich acid test, ellargi's test, Magnesium HCl test gave positive result. On the other hand shinoda test, maule test, syringin test, hydroquinone test & juglone test gave negative results. Where as hot water test shows doubtfully positive results.

Silvicultural : The seed germination and hardening through tissue culture has not been succeeded.

CONCLUSION

The present study reveals that there are many unique characters. This leads to the restriction for spreading of the *Guaiacum* species and endangering its existence in the state. Further, urgent study is required to conserve the unique creation of the nature.

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